FIVE YEAR REVIEW REPORT

FIRST FIVE-YEAR REVIEW REPORT

FOR

NATIONAL ELECTRIC COIL/COOPER INDUSTRIES, INC. SUPERFUND SITE

DAYHOIT, HARLAN COUNTY, KENTUCKY

September 2003

PREPARED BY:

United States Environmental Protection Agency
Region 4
Atlanta, Georgia

Approved by:

Winston A. Smith, Director
Waste Management Division
U.S. EPA Region 4

Date: 9/30/03

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (*from WasteLan*): National Electric Coil/Cooper Industries Inc.		
EPA ID (*from WasteLan*): KYD985069954		
Region: 4	**State:** Kentucky	**City/County:** Dayhoit/Harlan

SITE STATUS	
NPL status: Final Deleted Other (specify): _____	
Remediation status (choose all that apply): Underconstruction Operating Complete	
Multiple OUs?* YES NO	**Construction completion date:** 8/23/1998
Has site been put into reuse? YES NO	

REVIEW STATUS	
Lead agency: EPA State Tribe Other Federal Agency _____	
Author name: Derek Matory	
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 4
Review period:** 06/2002 to 09/2003	
Date(s) of site inspection: 7/28/2003	
Type of review: Post-SARA Pre-SARA NPL-Removal only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion	
Review number: 1 (first) 2 (second) 3 (third) Other (specify) _____	
Triggering action: Actual RA Onsite Construction at OU #NA Actual RA Start at OU #_____ Construction Completion Previous Five-Year Review Report Other (specify) _____	
Triggering action date (*from WasteLAN*): 08/23/1998	
Due date (*five years after triggering action date*): 08/23/2008	

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

1.0 INTRODUCTION

1.1 PURPOSE OF REVIEW

The purpose of the five-year review of the National Electrical Coil/Cooper Industries Superfund Site (Site) is to evaluate whether the remedy at the Site is protective of human health and the environment. The methods, findings, and conclusions of the review are documented in this Five-Year Review report. In addition, this Five-Year Review Report will identify issues found during the review, if any, and identify recommendations to address them.

1.2 AUTHORITY FOR CONDUCTING FIVE-YEAR REVIEW

The United States Environmental Protection Agency (EPA) prepared this Five-Year Review Report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA § 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or*

contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

1.3 AGENCY CONDUCTING THE FIVE-YEAR REVIEW

EPA Region 4 personnel conducted the five-year review of the remedial actions implemented at the Site. This review was conducted for the period from May 1998 through July 2003. This report documents the results of the review. Civil & Environmental Consultants, Inc. (CEC) and Shield Environmental Associates, Inc. (Shield), consultants for Cooper Industries, conducted analyses and provided information in support of the five-year review by EPA.

1.4 REVIEW PROCESS

This is the first five-year review for the Site. The triggering action for this policy review was completion of the remedial action construction activities that were outlined in the April 26, 1996 Record of Decision (ROD) for the Site and documented in the August 23, 1998 Preliminary Close-Out Report. The five-year review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This and subsequent five year reviews will be conducted for the Site as a matter of EPA policy, until the ground water cleanup levels are achieved, allowing unlimited use and unrestricted exposure.

2.0 SITE CHRONOLOGY

The chronology of site events is presented in Table 1 below.

TABLE 1

CHRONOLOGY OF SITE EVENTS

Event	Date
Plant Constructed.	1951
McGraw-Edison conveyed the facility to Treen Land Company.	August 01, 1987
Kentucky Department of Environmental Protection (KDEP) discovered VOC contamination at Trailer Park well.	February 27, 1989
Aboveground water tanks installed to provide water to contaminated wells.	April 01, 1989
Agreed Order from KDEP for water line installation.	May 01, 1989
Five-mile water line was installed and trailers/homes with contaminated wells were connected to the water supply. From July 31 through September 15, approximately 150 residents were connected.	August 07, 1989
Air stripper pilot test was performed at the Site.	April 01, 1990
About 200 cubic yards of impacted soils excavated at the Site and disposed of at the Chemical Waste Management facility in Kettleman Hills, CA.	June 01, 1990
EPA issued a Unilateral Administrative Order to Cooper regarding soil removal action.	October 01, 1990
Removal Action Plan submitted to EPA.	February 01, 1991
Removal Action report submitted to EPA. About 5100 tons of contaminated soils were excavated at the Site and disposed of at the Chemical Waste Management facility in Emelle, AL.	October 01, 1991
EPA executed an Administrative Order by Consent for the performance of RI/FS work.	May 01, 1992
Draft Work Plan and Project Operations Plan for interim action air stripper operation submitted to EPA.	May 01, 1992
Draft RI/FS work plan submitted to EPA.	July 01, 1992
"Interim" Record of Decision (ROD) issued by EPA for interim response action to initiate ground water cleanup.	September 01, 1992
The National Electric Coil/Cooper Industries Site included on National Priorities List.	October 01, 1992
EPA issued a Unilateral Order to Cooper for the performance of interim RD/RA activities associated with ground water cleanup.	December 01, 1992
EPA approved Work Plan to allow air stripper startup on an interim basis.	February 01, 1993

"Interim" Response Action is initiated to address ground water contamination while remedial investigation/feasibility study (RI/FS) and final ROD are being completed.	July 01, 1993
Remedial Investigation field activities completed.	August 01, 1993
RI/FS report submitted to EPA.	March 01, 1994
Baseline RA finalized by CDM.	June 01, 1995
ROD issued by EPA for ground water cleanup.	April 01, 1996
Remedial Design/Remedial Action UAO issued to Cooper by EPA.	May 20, 1996
EPA submits a Notice of Completion letter for RI/FS Consent Order.	February 01, 1997
The Remedial Design, Specifications and Performance Verification Plan submitted to EPA for approval.	March 01, 1997
EPA approves the Remedial Design.	May 01, 1997
Remedial Action (RA) Work Plan and Construction Management QA/QC Plan, Health & Safety Plan and Contingency Plan documents submitted to EPA.	August 01, 1997
The interceptor trench, deep well and intermediate well were installed. About 490 tons of excess soils generated from the trench excavation were disposed of at EQ's landfill in Michigan.	September 01, 1997
The Remediation Report was submitted to EPA.	March 01, 1998
The Final Operation and Maintenance Plan and Construction Completion Drawings were submitted to EPA.	July 01, 1998
Completion of RA on-site construction documented in Preliminary Close Out Report (PCOR) prepared by EPA.	August 01, 1998
Law Environmental submits Remedial Action Progress Report to EPA/KDEP. Ground water remediation system operating as designed and in compliance.	February 01, 1999
KDEP requested a Response Action Plan from Cooper to address PCBs in soil on Trailer Park property.	July 01, 2001
Shield submitted Risk Assessment Report on Trailer Park soil to KDEP. Report concluded de mimimis PCB levels in the soil.	August 31, 2001
EPA submitted letter to the KDEP that the PCB levels detected in the four trailer park soil samples do not present an unacceptable risk and response action is not warranted.	September 01, 2001
Soil sampling and Removal Action Work Plan submitted and approved by KDEP.	October 02, 2001
PCB soil cleanup and restoration completed on Trailer Park property. About 170 tons of soil and waste disposed of by Waste Management at its Louisville, Kentucky Outer Loop Landfill.	October 01, 2001
Remedial Action Report on the PCB soil cleanup submitted to KDEP.	October 26, 2001
Cooper received KDEP approval of PCB cleanup on Trailer Park property.	November 05, 2001
Semiannual Ground water Reports submitted.	Mar. and Sept. 2002
KPDES permit renewal application submitted to KDEP.	January 01, 2003

3.0 BACKGROUND

3.1 SITE LOCATION AND PHYSICAL SETTING

The Site is located on Old U.S. 119 adjacent to the Cumberland River in the town of Dayhoit, Harlan County, Kentucky (Figure 1). The Site includes the 3.5 acre National Electric Services (NES) manufacturing facility (Figure 2) which is currently in operation, and also encompasses the areal extent of the contamination plume. The facility consists of a main plant building, two smaller buildings, and asphalt paved parking lot with grass cover along the riverbank area. Topographically, the Site is located in the flood plain of the Cumberland River. The Site is relatively flat, except along the riverbank area, which slopes steeply down to the Cumberland River. The topography of the area near the Site consists of northeast-trending ridges of Pine Mountain and Cumberland Mountain and the bottom land associated with the Cumberland River and its tributaries.

The facility property is bordered on the south by the Holiday Mobil Home Trailer Park, a residential community; on the north by the Kentucky Utility Company electrical substation; on the east by the Cumberland River, and on the west by Old Highway 119. The property is fenced on all sides and has a security camera.

3.2 FACILITY OWNERSHIP AND USE

The facility was originally opened in 1951 by the McGraw-Edison Company (McGraw-Edison) and operated as a rebuilding and remanufacturing facility for coal mining and related industrial equipment including electric motors, rewinding electric coils, manufacturing, general machine shop work, and mining equipment repair. McGraw-Edison owned and operated the facility until 1985 when Cooper Industries, Inc. (Cooper) purchased McGraw-Edison as a wholly-owned subsidiary. McGraw-Edison continued to operate the facility until August 1987. The Treen Land Company of Brookside, Kentucky purchased the NEC building and property in August of 1987 and the operations were reopened as the National Electric Service Company (NES). The facility operates under the

National Electric Services Management Group, owned by Charles Dozier since July 1994, for electrical motor repair work and limited rebuilding of hydraulic systems for the coal industry. The facility currently employs less than 10 people. No change in land-use is anticipated in the near future.

3.3 HISTORY OF CONTAMINATION AND RESPONSE ACTIVITIES

3.3.1 Source of Contamination

From 1951 through 1976, NEC cleaned the equipment in a 4,000-gallon vat of trichloroethene (TCE) prior to servicing. From 1976 to 1985, equipment was cleaned with methylene chloride. From 1985 to 1987, equipment was steam cleaned with a non solvent cleaner. Periodically, the vat was cleaned, and the liquid solvent and oils reportedly were allowed to flow overland and/or through a drainage system to the Cumberland River. Sludge from the vat was reportedly disposed of along the river bank. The contamination was first identified in the ground water and soil in early 1989 as part of routine residential drinking water supply sampling conducted by the KDEP Division of Water.

3.3.2 Initial Response Actions

In October 1990, EPA issued a Unilateral Administrative Order (Order) to Potentially Responsible Parties (PRPs), McGraw-Edison/Cooper, Treen Land Company, and NES, to conduct an interim action removal of contaminated soils located on site. Cooper undertook the Site Removal Action activities with the approval of the current site property owner, NES.

Approximately 5,100 tons of soil was excavated for off-site disposal to CWM in Emelle, AL during the Removal Action activities. These activities were conducted to address immediate threats to human health. The EPA action levels that dictated removal were (1) 10 mg/kg PCBs; (2) 10 mg/kg total VOCs; (3) 5 mg/l TCLP lead; 5 mg/l TCLP chromium; and (4) 100 mg/kg total lead and chromium. All identified Site soils (including subsurface soils) that

exceeded EPA clean-up levels were excavated during the 1991 Removal Action. The excavations were then backfilled with clean soils brought from off-site.

Soil removal activities were conducted in five principal areas: (1) the rear of the property along the bank of the Cumberland River where fill material was located; (2) an outfall area, also located along the river at the rear of the property where two drainage pipes leading from the plant discharged; (3) an isolated area along the south fence line and adjacent to the trailer park; (4) an isolated area where equipment and drums were stored; and (5) an area where two drainage lines leading from the plant were located. The Removal Actions were conducted under EPA supervision from October 1990 through October 1991. On March 19, 1992, EPA notified McGraw-Edison Co./Cooper Industries, of its determination that all activities outlined in the Order had been completed addressing the soil issues at the Site.

The Site was proposed for inclusion of the National Priority List (NPL), as defined in Section 105 of CERCLA, as amended 42.S.C. 9605, on July 29, 1991. It was finalized as an NPL site on October 14, 1992.

The Site Remedial Investigation/Feasibility Study (RI/FS) and associated Site studies were conducted under the Administrative Order by Consent that McGraw-Edison/Cooper Industries, Inc., signed with the Agency in May 1992. The RI/FS and related Site studies were performed by Cooper Industries under the oversight of EPA and KDEP. The RI/FS was finalized in January 1995.

The RI included completing a number of tasks:

- Hydrologic Investigations
- On-site Soil Sampling
- Off-site Soil Sampling
- Sediment Sampling
- Aquatic Assessment (benthic macroinvertebrates and fish)

- Meteorological Study/Air Sampling
- Risk Assessment for Human Health and the Environment

For the FS portion of the project, numerous alternative remedial actions were screened. Selected alternatives underwent detailed analyses and were compared to the nine criteria required by the NCP.

3.3.3 Chemicals of Concern and Exceedances of Standards

On-site soil samples were collected from subsurface areas where the 1991 Removal Action confirmatory samples indicated that contaminants remained at levels above "non-detect". The purpose of this sampling was to determine whether contaminants remained in subsurface areas in quantities that might leach to ground water. Analyses of the samples indicated that neither VOCs nor inorganics, such as lead and chromium, remained in the subsurface in levels that would significantly impact ground water via contaminant leaching.

Off-site soil samples were collected from the Holiday Mobile Home Park to determine whether soils located there had been impacted by the contaminants originating at the NEC site. The area sampled at the mobile home park stretched the length of the fenceline separating the properties, at a maximum distance from the fenceline of 100 feet onto the trailer park property. The findings indicated that the soils at trailer park had not been significantly impacted by the NEC contaminants since only one of the 29 samples collected marginally exceeded the 1 mg/kg PCB action level; no VOCs were detected in the off-site soils and only low levels of semivolatiles and pesticides were detected; only low levels of dioxins and furans were detected in surficial soil samples collected near the fenceline at the mobile home park; and inorganic concentrations detected in the off-site soils were consistent with background or naturally occurring levels.

Historically, several VOCs have been detected in the ground-water samples collected from the Site; however, the contaminants with the highest concentrations detected include

trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride, and 1,1-DCE. Table 2 shows the ground-water recovery system at approximately 90% efficiency and summarizes the ground-water system influent and effluent concentrations for cis-1,2-DCE, TCE and vinyl chloride.

3.3.4 Extent of Ground-Water Contamination

The shallow ground-water aquifer was sampled as part of the Site's Remedial Investigation. Initially, five shallow wells were installed (BH-1 through BH-5) and sampled in 1990. Subsequently, an additional shallow well (BH-0) was constructed upgradient and was sampled initially in 1991 along with the other five wells. A map of the location of each of the wells is shown on Figure 2. One additional sampling of the shallow wells occurred in 1994. The only two volatile organic compounds detected during this last sampling round was total 1,2-dichloroethene and trichloroethene. No pesticides nor PCBs were detected in the shallow wells and a single semivolatile compound, naphthalene, was detected at only 0.2 ug/l in shallow well BH-4. Although several inorganic heavy metals were detected above current MCLs, the upgradient or background well also exceeded the standard, probably due to turbidity and solids in the wells. Therefore, the primary chemicals of concern for the shallow ground water are total 1,2-dichloroethene and trichloroethene. A summary of the analyses for these two compounds is presented below on Table 3. As can be seen, there has been a general decrease in concentrations of these two compounds over time. The more recent analyses conducted on the shallow aquifer via the interceptor trench also indicate a decreasing trend in shallow water concentrations (See Trench data summarized on Table 5).

Table 2

Ground-Water Recovery System Efficiency

First Semi-Annual 2003 Monitoring Event

National Electric Coil

Harlan, Kentucky

Month	Total Flow (millions of gallons)	Influent Concentrations (ug/l)			Effluent Concentrations (ug/l)			VOCs removed by system (pounds)			Total VOCs Removed (lbs)	System Efficiency (%)
		cis-1,2-DCE	TCE	Vinyl Chloride	cis-1,2-DCE	TCE	Vinyl Chloride	cis-1,2-DCE	TCE	Vinyl Chloride		
Jan.	1.884	310	60	27	58	*2.5*	*1.0*	4.0	0.9	0.4	5.3	84.5%
Feb.	5.420	310	60	27	44	*2.5*	*1.0*	12.0	2.6	1.2	15.8	88.0%
Mar.	5.995	480	39	38	40	*2.5*	*1.0*	22.0	1.8	1.8	25.7	92.2%
Apr.	7.143	310	37	33	25	*2.5*	*1.0*	17.0	2.1	1.9	20.9	92.5%
May	5.327	310	37	33	32	*2.5*	*1.0*	12.4	1.5	1.4	15.3	90.7%
Jun.	7.135	310	37	33	23	*2.5*	*1.0*	17.1	2.1	1.9	21.0	93.0%
Total	32.904	---	---	---	---	---	---	84.4	11.0	8.7	104.0	---
											Ave. Efficiency	90.2%

Notes:

[1]January and February Influent concentrations estimated based on sample collected in December 2002

[2]May and June Influent concentrations estimated based on sample collected in April 2003

[3]Italic numbers indicate that the target compound was not detected and one-half of the detection limit was used in calculations.

[4]System Influent generally sampled on quarterly basis.

System Effluent is required to be sampled monthly under new KPDES Permit.
System Efficiency = (Influent Concentration – Effluent Concentration) / Influent Concentration.

Table 3

Summary of Shallow Ground-Water Sampling Results

Analytes	Date	1,2-DCE	TCE
BH-0	04/91	U	U
	01/94	U	U
BH-1	01/90	46	26
	04/91	19	16
	01/94	4 J	14
BH-2	01/90	U	4100
	04/91	740 J	12000
	01/94	86	2700 D
BH-3	01/90	2100	6900
	04/91	3700	1700
BH-4	01/90	35	1500
	04/91	15 J	550
	01/94	2 J	130
BH-5	01/90	44	990
	04/91	96	1200

Concentrations in ug/l
U = Undetected
J = Estimated value below CRDL
D = Value after dilution

Prior to implementing the remedy, the contaminated deeper bedrock ground-water plume extended nearly 3,000 feet down gradient (southwest) of the Site across the Cumberland River to the Yo Yo Market well number 90. Based upon the current ground-water analyses, the plume has shrunk to approximately one-half of its original size or about 1,500 feet long (See Figure 3). If we just look at the data over the past 5 years (Figure 4), it is readily apparent that there has not been a significant reduction in plume size over this time period. However, the overall VOC concentrations within the extraction wells have generally decreased from 15 to 60 percent, the size of the plume has remained relatively constant over the past 5 years, still less than 1500 feet long.

3.3.5. PCB Soil Removal

PCBs were detected during previous sampling events (1994 and 2001) in surface soils located within the boundaries of the Holiday Acres Mobile Home Park along the fence line directly adjacent to the NEC site. While initially considered to be within acceptable federal and state levels, in a letter dated September 26, 2001, the Kentucky Division of Waste Management (KDWM) Risk Assessment Branch recommended that 0.126 mg/Kg total PCBs now be applied as a risk-based clean-up guideline for soils outside of the fence line at NEC. A few of the aforementioned sampling results exceeded the proposed guideline. In an effort to address the KDWM agency's concerns, Cooper agreed to perform a surface soil removal action. In October 2001, approximately 170 tons of soil were removed from the area shown on Figures 5 and 6 and transported to Waste Management's Outer Loop Landfill in Louisville, KY for disposal. Cooper received a "no further action" letter dated November 5, 2001 from the KDWM.

4.0 REMEDIAL ACTIONS

4.1 REMEDY SELECTION

The ROD was finalized on April 26, 1996. The Selected Remedy included ground-water remediation to address contaminated ground water located in the fractured bedrock and alluvial (shallow) aquifers beneath the Site. The goal of the selected remedial action was to restore the site impacted ground water to levels below that of applicable Maximum Contaminant Levels (MCLs), i.e., drinking water standards, although the ground water is currently not being used with the installation of a community waterline. The major components of the ground-water remedy included:

- Recovery of contaminated ground water from the impacted alluvial and bedrock aquifers beneath and adjacent to the Site
- Treatment of the recovered water with air stripping
- Catalytic oxidation of the VOC-laden off gas
- Discharge of the treated water to the Cumberland River

The Remedial Action Objective (RAO) for this remedy is to control risks posed by direct contact with ground water and minimize migration of contaminants in ground water.

4.2 REMEDY IMPLEMENTATION

In October 1990, the EPA issued a Unilateral Administrative Order (UAO) (USEPA Docket No. 90-57-C) requiring immediate actions designed to mitigate the release of hazardous substances from the Site. Cooper subsequently contracted with Law Engineering & Environmental Services (Law) to develop and implement a Remedial Action Plan (RAP) in accordance with the UAO. As part of the RAP, monitoring wells were installed at the Site to evaluate the magnitude of the ground-water contamination (See Table 4 below).

Table 4

Ground-Water Monitoring Network

National Electric Coil
Harlan, Kentucky

Monitoring Requirement	Shallow	Intermediate	Deep
Groundwater Levels Only	BH-0 BH-1 BH-2 BH-3 BH-4 BH-5	CMW-5-11A CMW-5-11B	CMW-5-0 CMW-12A
Groundwater Levels and Groundwater Samples	Trench	R-2 CMW-12	CMW-5-2 CMW-5-2A CMW-5-10 CMW-5-11* CMW-6 CMW-7 CMW-9 CMW-12-16 CMW13A CMW-13 CMW-85

* Ground-Water Sample Only – No Access for Water Levels

Using existing wells, an "Interim" response action was developed and conducted to control migration of the VOC ground-water plume identified beneath the Site while the Remedial Investigation/Feasibility Study and the Final ROD were being completed. The "Interim" RA was initiated in July 1993 and consisted of an onsite Recovery Well CMW-5-11 located in the deeper bedrock aquifer zone (at an approximate depth of 120 feet), an equalization tank, an air stripping tower, and a 10,000 pound activated carbon unit to treat the air stripper off-gas

Upon the completion of the April 1996 "Final" ROD, the Selected Remedy was implemented at the Site to address contaminated ground water by continuing use of the ground-water pump and treat system (initiated during the "Interim" response action) to recover ground water and to separate VOCs from extracted ground water, by means of air stripping technology. Off-gases from the air stripping technology were to be addressed using catalytic oxidation. The scope of the Interim response action was increased by incorporating the use of a ground-water recovery trench located in the shallow alluvial aquifer and an additional ground-water recovery well in the intermediate aquifer with that of the system already operating in the deeper zones of the underlying bedrock aquifer. An additional deep aquifer recovery well was also installed. The air stripper off-gases had been treated using activated carbon. However, the carbon filters were not effective in the removal of vinyl chloride. Therefore the off-gases were treated through a catalytic oxidation system (instead of activated carbon) prior to being discharged into the atmosphere via an extended 60-foot tall air stack to optimize off-gas dispersion.

The final ground-water recovery system consisted of four recovery units: an interceptor trench located in the shallow alluvial aquifer (approximately 190 feet long and 24 feet deep); Recovery Well R-2 located in the intermediate bedrock aquifer zone (approximately 80 feet deep); Recovery Well CMW-5-2A located in the deeper bedrock aquifer zone (approximately 125 feet deep); and existing Recovery Well CMW-5-11 (approximately 120 feet deep) located in the deeper bedrock aquifer zone. The final ground-water treatment system consisted of a 2,000-gallon double-walled equalization tank, the existing air stripper tower was upgraded, and a catalytic oxidation system to treat the off-gases from the air stripping tower, in accordance with the EPA approved air emission performance standards. Treated water from the air stripper continues to be discharged to the Cumberland River in compliance with the requirements of a KPDES permit. The layout of the remediation system is shown on Figure 2.

"Final" response action activities were conducted between September 1997 and February 1998. The final ground-water recovery systems and the catalytic oxidation (cat-

ox) unit started up in February 1998. A schematic of the ground-water recovery and treatment systems is provided on Figure 7.

4.3 SYSTEM OPERATIONS AND MAINTENANCE

The operation and maintenance (O&M) of the Site is conducted by Eastern Well & Pump (EW&P) from Harlan, Kentucky on behalf of Cooper. O&M of the facility includes:

- General housekeeping and weed control.
- Maintenance of fence that surrounds the facility.
- Inspection of the condition of ground-water monitoring wells.
- Maintenance and upkeep of the pumping wells.
- Maintenance and upkeep of the packed tower.
- Maintenance and upkeep of the cat-ox Unit.
- Collection of onsite weather data.
- Monitor the system discharge in accordance with the KPDES

The well pumps, cat-ox unit, blowers, transfer pumps, pumping wells and flow meters are generally checked three times a week to see if they are operating properly. All items are repaired as needed to properly perform. The transfer pumps and blowers on the cat-ox and air stripping units are greased monthly. The air stripper is cleaned twice a year to maintain proper operation. In addition, Cooper also conducts semi-annual ground-water monitoring of onsite and off-site wells with Shield.

5.0 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW FOR THE SITE

This was the first five-year review for the Site.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 COMMUNITY NOTIFICATION AND INVOLVEMENT

Activities to involve the community in the five-year review mainly consisted of interviews of those formally identified as having an interest in cleanup of the Site. Individuals interviewed were either contacted by phone or in person to gather their comments and concerns regarding the Site and its clean up. Notices were sent to local newspapers to announce both the initiation and conclusion of the five-year review report process.

6.2 DOCUMENT REVIEW

This five-year review consisted of a review of relevant documents, including the 1996 ROD, the Administrative Order, O&M Records, and Ground-Water Monitoring Reports.

6.3 DATA REVIEW

6.3.1 System Influent

From July 1993 until the final RA system was started in February 1998, the influent concentration showed a decreasing trend through time. The influent concentrations rose significantly once the new RA system was activated in February 1998. However, since that time, the concentrations are again showing a decreasing trend through time. Figure 8 is a graph showing influent VOC concentrations over time and the leveling off of contaminants.

6.3.2 Contaminant Removal

Since January 1997, approximately 2,369 pounds of VOCs have been removed from the ground water. Since the start-up of the system in July 1993, approximately 3,915 pounds of VOCs have been removed from the aquifer. Table 2 summarizes the ground-water recovery

system efficiency for the first half of 2003. Appendix A summarizes the recovery data since January 1997.

6.3.3 Off-Gas Treatment

The VOC air emission concentrations in both the cat-ox influent and cat-ox stack effluent samples were well below the standards established by EPA in the ROD. Cooper used the maximum cat-ox system influent concentration for each compound analyzed during the second half of 2002 in determining the percentage of air emission with respect to the standard. For cis-1,2-DCE, TCE, and vinyl chloride, the maximum concentrations were measured in December 2002. The 2,990 ppbv value for cis-1,2-DCE equates to 0.05 percent of the 5,850,000 ppbv standard. The 188 ppbv value for TCE represents 0.96 percent of the 19,600 ppbv standard and the 417 ppbv value for vinyl chloride equates to 49.8 percent of the 837 ppbv standard.

6.3.4 Ground-Water Monitoring

Based on the results from the latest ground-water sampling event (April, 2003), only three off-site monitoring wells exhibit concentrations above their respective standards. Cis-1,2-DCE remains above the MCL in CMW-7 and CMW-12 and vinyl chloride is above its MCL in CMW-7, CMW-9 and CMW-12. Trichloroethylene (TCE) was not detected in any of the off-site monitoring wells. The absence of TCE and the presence of cis-1,2-DCE and vinyl chloride in these off-site wells indicates that natural degradation is occurring in addition to the active removal and treatment of the VOC plume. Onsite, the active pumping wells show elevated concentrations of TCE, cis-1,2-DCE, and vinyl chloride above their respective MCLs. However, several breakdown products of TCE, including trans-1,2-DCE are present, also indicating that natural degradation is occurring in addition to the active remediation.

Since ground-water remediation began in 1993, TCE levels of the on-site wells have dropped significantly as shown in Table 5. Additionally, the total VOC plume has been

greatly reduced (Figure 3). Most of the plume shrinkage occurred during the first few years of remediation and very little shrinkage has occurred in the past 5 years (Figure 4), however, the overall total VOC concentrations have generally decreased by between 15 and 60 percent.

Table 5

TCE Concentrations at Extraction Points

Date	Trench	CMW-5-11	R-2	CMW-5-2	CMW-5-2A
1993	N/A	710	N/A	1700	NA
1998	2280	43	1460	470	470
2003	810	7.6	97	31	85
% Decrease	**64.5**	**98.9**	**93.4**	**98.2**	**81.9**

Concentrations in µg/l (ppb)
N/A – Not applicable since trench, R-2 and CMW-5-2A not installed and operating until 1998.
Data from 1993 and 2003 are derived from single samples. Two samples were analyzed in 1998 and the highest value was selected.

6.4 SITE INSPECTION

The site inspection was conducted on 28 July 2003, by the RPM and the Site PRP representative and their contractor. The purpose of the inspections was to assess the protectiveness of the remedy. The contractor conducted an overview of the operational history of the air stripper system components as a means of demonstrating the system has functioned as designed. Visual inspection of extraction wells and monitoring wells utilized during the monitoring program was carried out as well. The ground-water treatment system and associated wells appeared to be in good condition and operational.

6.5 INTERVIEWS

Interviews were conducted by the EPA Region 4 Community Relations Specialist, assigned to this site. Individuals formally involved with the Site were contacted for interviews both by telephone and in person during the period 20 May through 28 July 2003.

The questions asked by EPA Region 4 were as follows:

1. **What is your impression of the project?**
   The majority of people interviewed had a good impression of cleanup work conducted at the Site. However, some thought more could have been done and that there remain some unanswered questions about the removal of all contaminants.

2. **Overall, have you been pleased or displeased with cleanup actions at this site?**
   Most people answered this question affirmatively. But, some expressed displeasure because they feel the Site was not totally cleaned up.

3. **What effects, if any, have site operations had on the surrounding community?**
   The ground-water contamination problem enabled residents to connect to city water. It also scared many people and has made people question why there seems to be a high occurrence of cancer in their community.

4. **Do you still have any concerns regarding EPA cleanup activities at the site?**
   Many people still have concerns about the fish in the river and the water and sediments in the river. Because many people still believe contamination is present in the soil, groundwater, river sediment and water, concerns have not been totally relieved. Also, due to the topography in the mountainous areas, it is believed groundwater travels in many directions and will never be cleaned up. Health issues are the main concerns with many incidents of deaths caused by cancers and tumors were cited. Concerns were expressed that contamination from this site has spread into neighboring areas such as Watts Creek and other water bodies. Also, another concern expressed questioned the impact of the emissions from the air stripper on surrounding soil, water, and air and stated that more monitoring of the air and river is needed.

5. **Are you aware of any events, incidents or activities or activities at the site such as vandalism, trespassing or emergency responses from local authorities?**
   No one seemed to be aware of any suspicious activities at the Site.

6. **Do you feel well informed about the site's activities and progress?**
   Most everyone believed that they had been kept informed while site work was on going, but had not heard anything about the Site in a number of years. A few people stated that they had not been kept informed.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
   There were only two opinions expressed. One thought was that the remedial operation should continue and include the catalytic oxidation of air stripper effluent. The other thought that with the amount of technical data now available (on air outlet stream), the catalytic oxidation process could be eliminated.

8. **Do you have any suggestions that EPA can implement to improve communication with the public?**
   Only one person interviewed had a suggestion and that was more information needs to be placed on the internet, since most people no have computers. This would make it easier to keep information on activities up-to-date and possibly allow individual questions to be addressed.

7.0 TECHNICAL ASSESSMENT

7.1 REMEDY EVALUATION

Question A: Is the remedy functioning as intended by the decision documents?

The ground-water contour maps generated for the shallow and deep aquifers indicate that the recovery system is effectively capturing the contaminated ground water. In the shallow aquifer, the ground water appears to be captured by the trench system (See Figure 9). In the intermediate aquifer, historic data demonstrate capture at this level (See Figure 10). The capture zone developed in the bedrock zone extends beyond the leading edge of the plume (See Figure 11). This finding indicates that the system is not only controlling the plume's movement, but is also removing and remediating the remaining ground-water contamination.

Samples collected from the ground-water recovery extraction points (Trench, R-2, CMW-5-2A and CMW-11) and in the influent water to the air stripper detected decreasing levels of TCE, 1,2-DCE, and vinyl chloride. The historical sampling results are summarized in tables contained in Appendix B. The rates of concentration decreases have slowed somewhat since the final system started up in February 1998, as is typical of these systems. The presence of the degradation products of TCE (1,2-DCE and vinyl chloride) indicates that biodegradation is occurring in the aquifers and is actively supporting natural attenuation of the plume. The ground-water analytical results and hydrogeologic data collected from the off-site wells in the deep aquifer indicate off-site migration of contaminants is being controlled and mitigated by the remediation system. The only off-site wells exhibiting constituent concentrations in excess of the MCLs during the most recent ground-water sampling event were wells CMW-7, CMW-9 and CMW-12. Figure 12 summarizes the analytical results from the April 2003 semi-annual sampling.

The continued operation of the ground-water remediation treatment system along with the monthly monitoring and maintenance of the remediation system will continue to remediate

the aquifers and prevent off-site VOC contaminant migration.

Site operation and maintenance activities are performed by Eastern Well & Pump. Other than occasional iron fouling of the pumping wells and the packed-column stripper requiring semiannual cleaning, no major issues have been identified with the system. General maintenance is also performed at this time and the system is generally shut down for a two-week period. Other than these semi-annual scheduled events, the system has not been shut down for any extended period of time.

The ground-water treatment system continues to be effective at removing VOCs from the ground water extracted from the shallow, intermediate, and deep aquifer recovery wells. Since the startup of the RA system in January 1997, approximately 2,369 pounds of VOCs have been removed.

No substantial changes to the current extraction system are recommended based on the historic success and the general upward trend of cumulative VOCs removed. However, due to the leveling off of cumulative VOCs volume and essentially no change in plume size over the past 5 years, the on/off pumping schedule will be adjusted to pulse the system. Ground-water research has shown that the pulsing action can improve the efficiency of the removal and treatment system. It is recommended that the system be operated every other week and subsequently adjusted as appropriate based upon the results of system monitoring.

The Site continues to be enclosed by a chain-link fence to restrict access to the site. Furthermore, a remote monitoring security system has been installed by NES personnel. Onsite and off-site monitoring wells are securely locked to limit access. Access agreements have been executed with the property owners onsite and off-site for ground-water sampling.

7.2 APPLICABILITY OF ESTABLISHED REMEDIAL ACTION OBJECTIVES

Question B. Are the exposure assumptions, toxicity data, clean up levels and RAOs used at the time of remedy selection still valid?

7.2.1 Changes in Standards and To Be Considered (TBC)

The cleanup standards established in the ROD for the chemicals of concern have not changed in the last five years and are still applicable to the remedial action. However, the KDEP revised their PCB soil guidance level and that resulted in the removal of additional soil from the trailer park adjacent to the NEC plant site. Additionally, the Kentucky Division of Air Quality (DAQ) repealed its air toxics standards program in 1999 and adopted the federal regulations. Since air emissions were not a problem at the Site, this change had no effect on this program. The U.S. EPA also published revised soil, air and ground-water data for 1,1-DCE on the Agency's IRIS database indicating that this compound was less toxic and did not pose as great a risk of cancer as was originally thought. Even though 1,1-DCE was a chemical of concern for this site, since risks to human health were already very low for this particular compound, it essentially would have no effect for this site.

7.2.2 Changes in Exposure Pathways, Toxicity and Other Contaminants

The area surrounding the Site has not changed significantly over the past five years and no additional exposure pathways have been established.

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures and potential future exposures. There have been no changes in the toxicity factors for contaminates of concern (except as noted above for 1,1-DCE) that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted.

The only changes during this time frame would be a reduction in contamination concentrations resulting from the removal of the more heavily contaminated soil and the ground-water recovery and treatment program.

Based on the review of the data collected over the last five years, it appears that the system is progressing towards meeting the RAOs. Several onsite and three off-site locations show concentrations of VOCs above the RAO; however, the presence of daughter products also indicates some natural degradation of the VOCs, in addition to the active remediation.

7.3 PROTECTIVENESS OF REMEDY

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The remedy is protective since it is achieving the RAOs and the community is still using municipal water for drinking water and other purposes. No significant changes have occurred at the Site or the surrounding area that would call into question the protectiveness of the remedy.

8.0 IDENTIFIED ISSUES

No significant issues were identified.

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

In order to improve the effectiveness of the ground-water remediation system it is suggested that the PRP propose alternate pumping rates and/or periods in order to optimize contaminant recovery from the impacted aquifers. While these actions are not expected to affect the Remedy's protectiveness, the length of the remedial action may be reduced as the result of optimized ground-water contaminant removal.

10.0 PROTECTIVENESS STATEMENT

The remedy is expected to be protective of human health and the environment upon attainment of ground-water cleanup goals, through continued ground-water pump and treat, which is expected to require 20 years to achieve. In the interim, exposure pathways that could result in unacceptable risks have been controlled since residences within the path of the ground-water plume have been provided with municipal water via water lines to all impacted residences. Other feasible threats have been addressed through excavation and removal of contaminated soils.

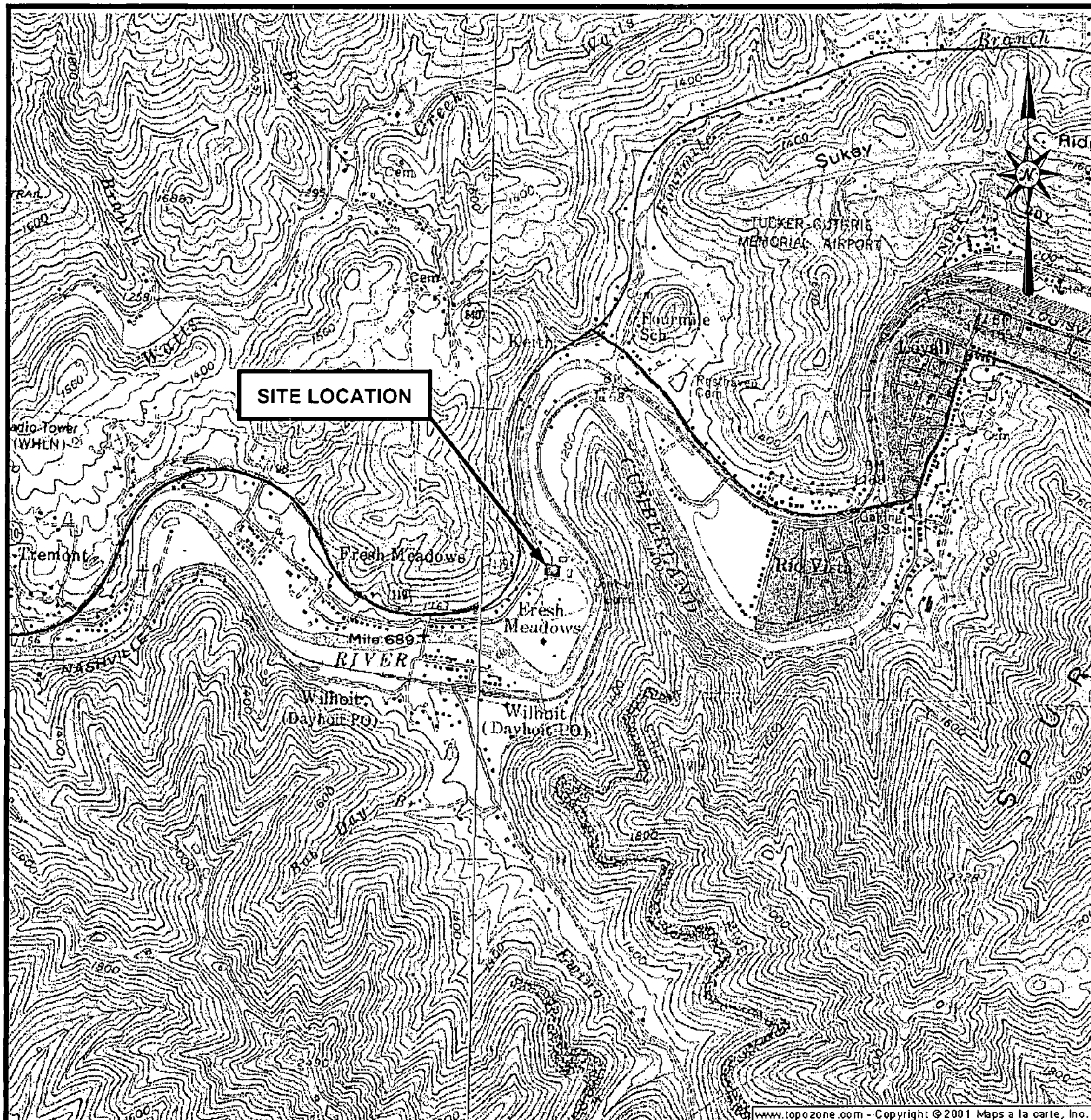
Long-term protectiveness of the remedial action will be verified by obtaining additional ground-water samples to fully evaluate potential migration of the contaminant plume downgradient from the treatment area and towards the river. Current data indicate the plume is being contained and retracted. Current monitoring data indicate that the remedy is functioning as required to achieve ground-water cleanup goals.

11.0 SUMMARY OF PROJECT COSTS

As indicated in the 1998 Remedial Action Report for the project, the actual construction costs did not differ significantly from the cost estimate ($328,800) provided in the Record of Decision (ROD). The annual operating and maintenance (O&M) costs have been slightly less than the estimate provided in the ROD ($140,627 versus $187,900). Cooper Industries has funded 100 percent of this Remedial Action.

12.0 NEXT REVIEW

The next five-year review for the NEC Superfund Site is required by August 23, 2008, five years from the date of this review.



SOURCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE MAP
LEXINGTON WEST, KENTUCKY 1988

0' 1,000' 2,000' 3,000'

APRIL, 2003

PROJECT NO.: 303-1360
DRAWN BY: BG
APPROVED BY: MM

FIGURE 1
TOPOGRAPHIC MAP
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
2456 Fortune Drive, Suite 100
Lexington, KY 40509
(859) 294-5155

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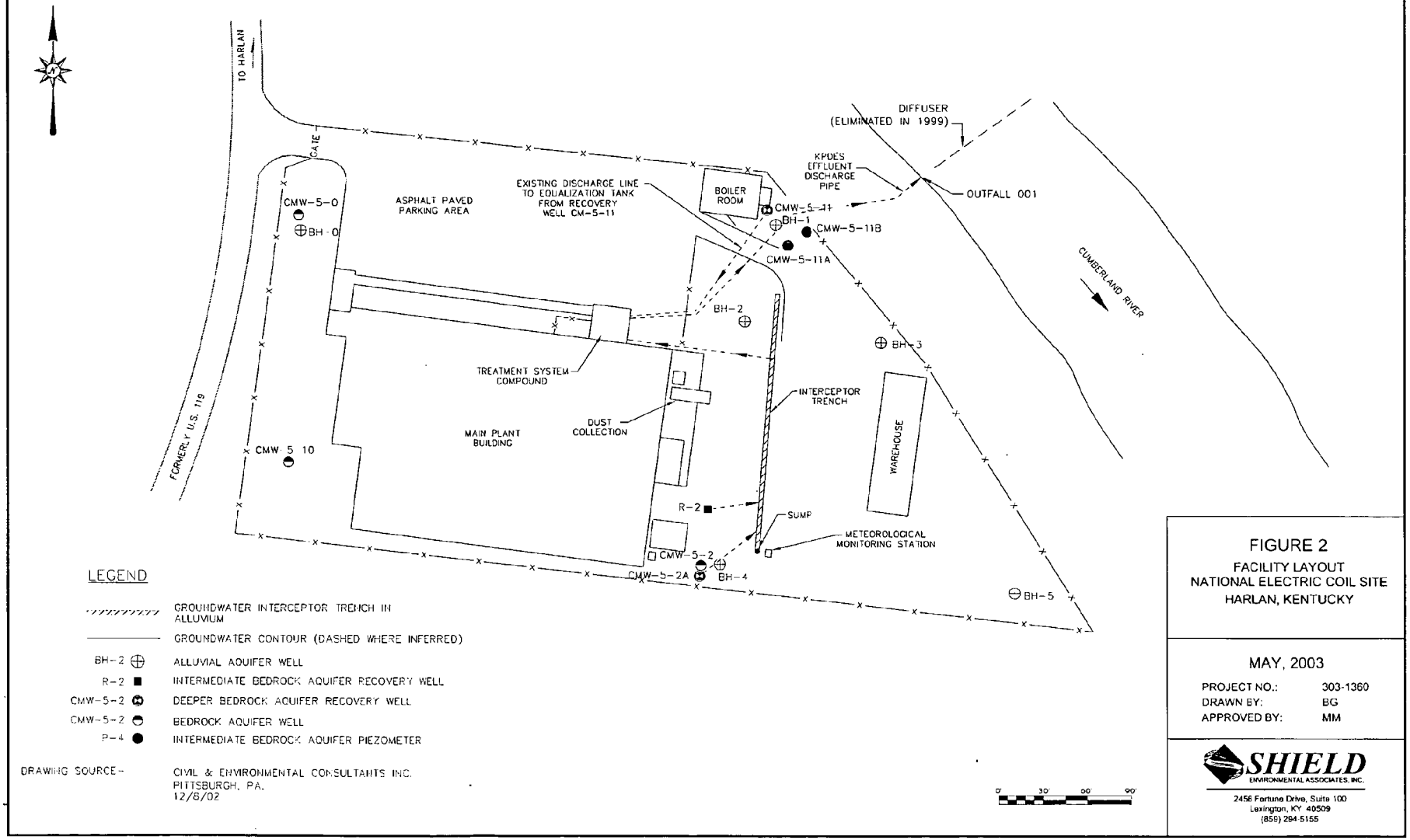

FIGURE 2

FACILITY LAYOUT
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY

MAY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
2456 Fortune Drive, Suite 100
Lexington, KY 40509
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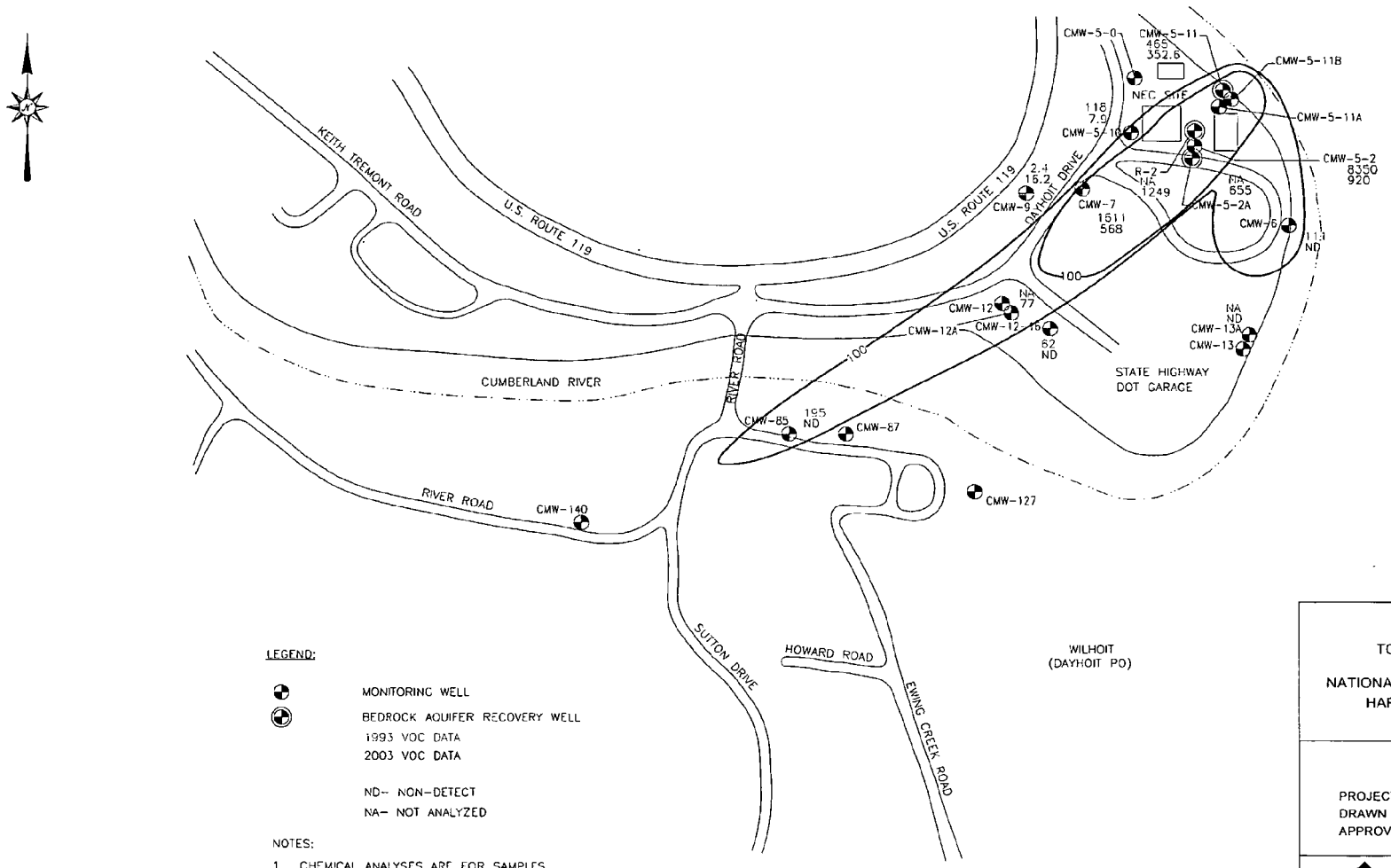

LEGEND:

- MONITORING WELL
- BEDROCK AQUIFER RECOVERY WELL
- 1993 VOC DATA
- 2003 VOC DATA

ND-- NON-DETECT
NA- NOT ANALYZED

NOTES:

1. CHEMICAL ANALYSES ARE FOR SAMPLES COLLECTED IN APRIL, 2003.
2. RESULTS ARE IN µg.
3. RESULTS ARE SHOWN ONLY FOR COMPOUNDS OF CONCERN.

FIGURE 3

TOTAL VOC DATA
1993/2003
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY

MAY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

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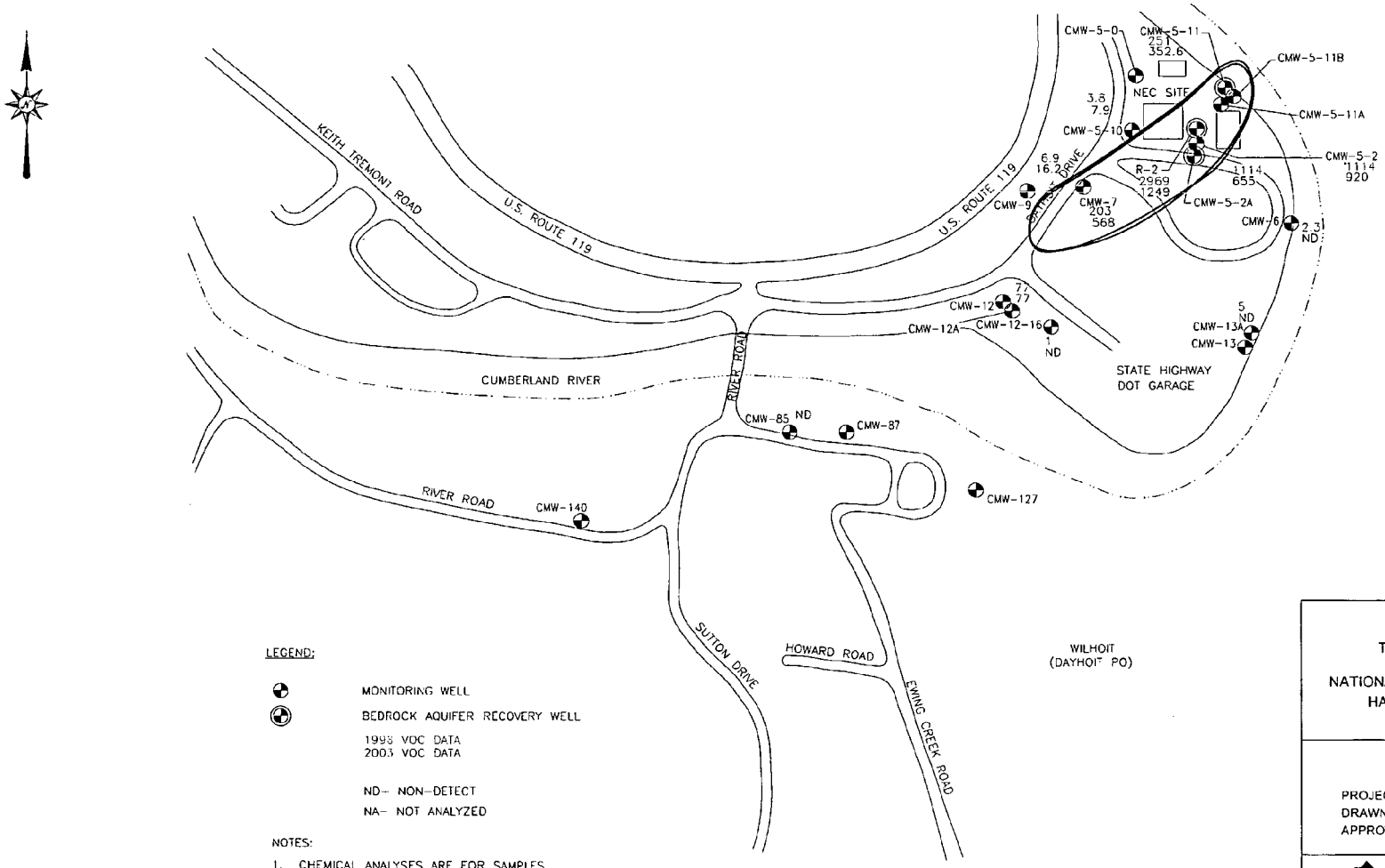

LEGEND:

- MONITORING WELL
- BEDROCK AQUIFER RECOVERY WELL
  - 1998 VOC DATA
  - 2003 VOC DATA
- ND– NON–DETECT
- NA– NOT ANALYZED

NOTES:

1. CHEMICAL ANALYSES ARE FOR SAMPLES COLLECTED IN APRIL, 2003.
2. RESULTS ARE IN µg.
3. RESULTS ARE SHOWN ONLY FOR COMPOUNDS OF CONCERN.

FIGURE 4

TOTAL VOC DATA
1998/2003
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY

JULY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

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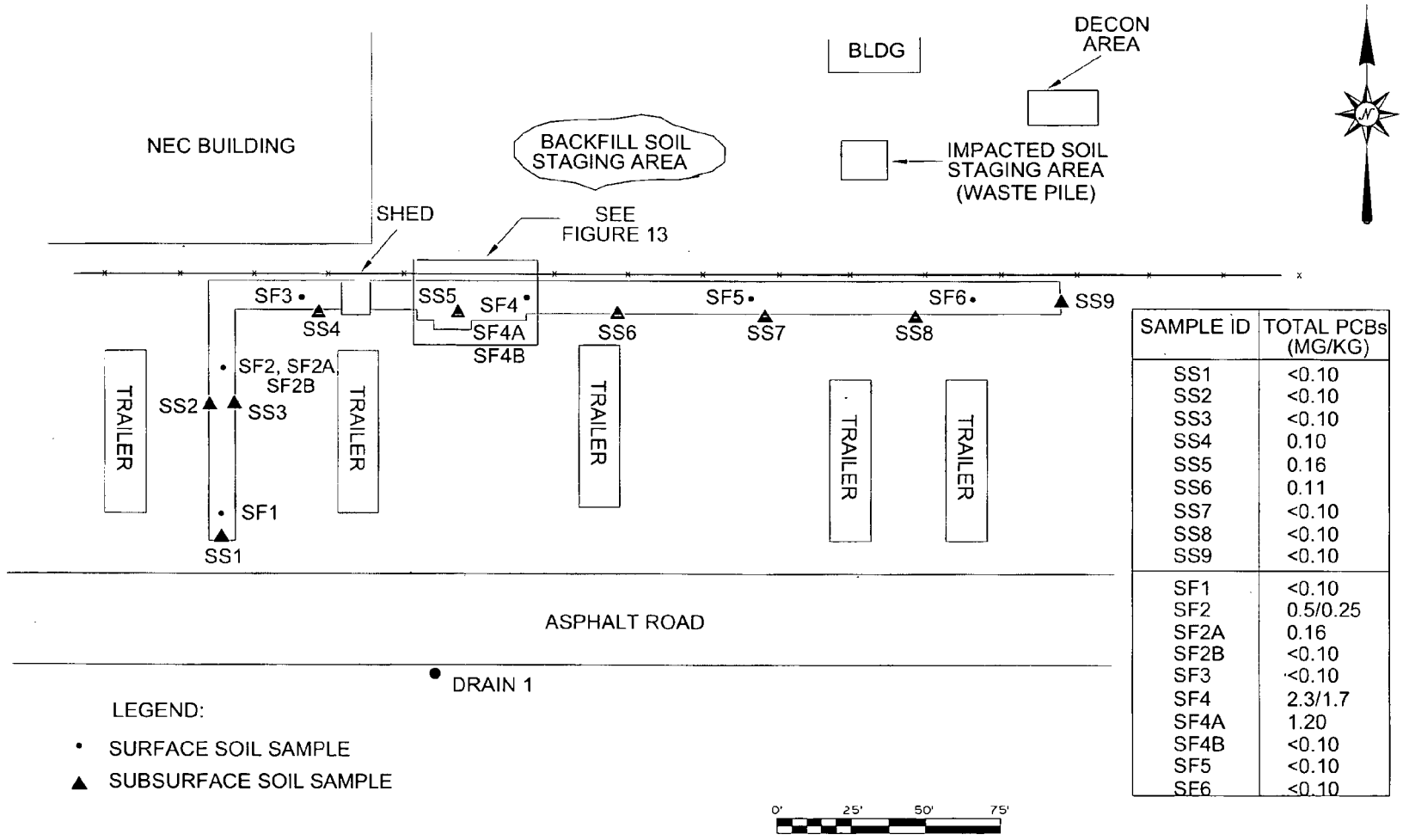

SAMPLE ID	TOTAL PCBs (MG/KG)
SS1	<0.10
SS2	<0.10
SS3	<0.10
SS4	0.10
SS5	0.16
SS6	0.11
SS7	<0.10
SS8	<0.10
SS9	<0.10
SF1	<0.10
SF2	0.5/0.25
SF2A	0.16
SF2B	<0.10
SF3	<0.10
SF4	2.3/1.7
SF4A	1.20
SF4B	<0.10
SF5	<0.10
SF6	<0.10

JULY 2003

PROJECT NO: 301-1370
DRAWN BY: BG
APPROVED BY: MM

FIGURE 5

PCB EXCAVATION AREA AND SAMPLING POINTS
NATIONAL ELECTRIC COIL SITE AND
HOLIDAY ACRES MOBILE HOME PARK
DAYHOIT, KENTUCKY

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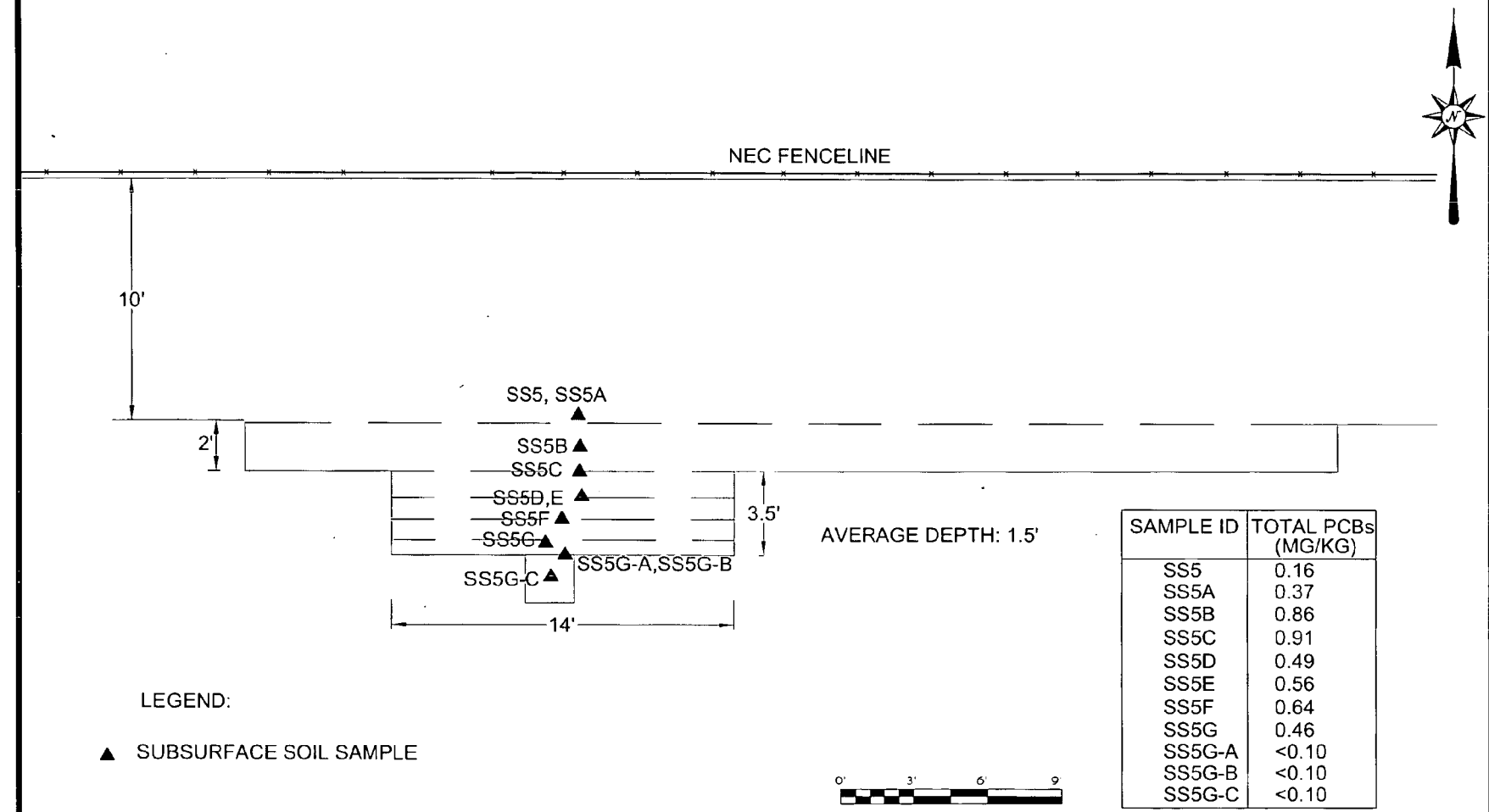
Lexington, KY 40509
(859) 294-5155



SAMPLE ID	TOTAL PCBs (MG/KG)
SS5	0.16
SS5A	0.37
SS5B	0.86
SS5C	0.91
SS5D	0.49
SS5E	0.56
SS5F	0.64
SS5G	0.46
SS5G-A	<0.10
SS5G-B	<0.10
SS5G-C	<0.10

JULY 2003

PROJECT NO: 301-1370
DRAWN BY: BG
APPROVED BY: MM

FIGURE 6

PCB SAMPLING LOCATIONS IN THE VICINITY OF SS5
NATIONAL ELECTRIC COIL SITE AND
HOLIDAY ACRES MOBILE HOME PARK
DAYHOIT, KENTUCKY

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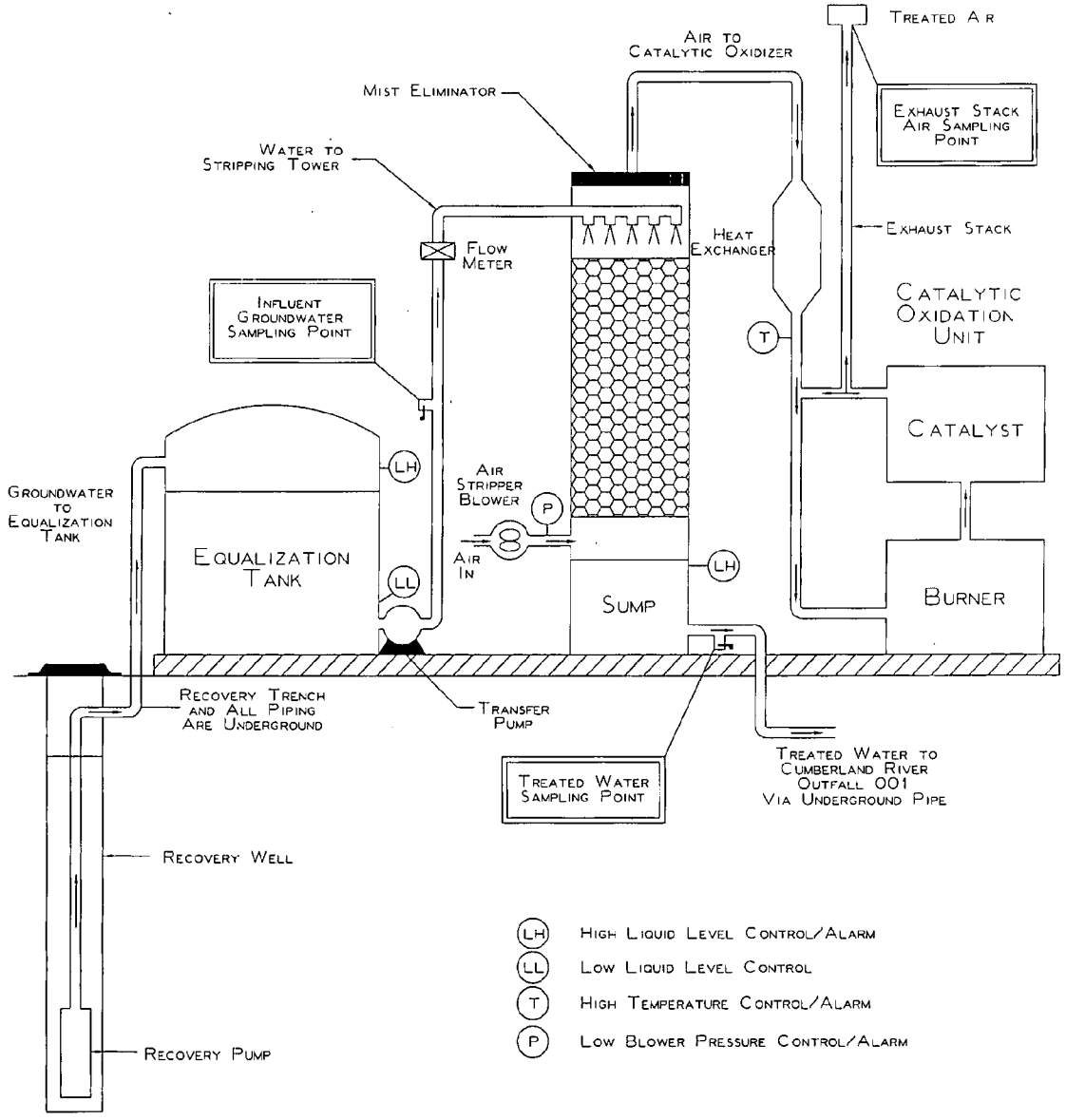
2456 Fortune Drive, Suite 100
Lexington, KY 40509



REFERENCE

Law Engineering and Environmental Services
Feasibility Study, February 1995

Not to Scale

JUNE 2003

PROJECT NO: 303-1500
DRAWN BY: DLH
APPROVED BY: KDR

FIGURE 7

GROUNDWATER RECOVERY SYSTEM
TREATMENT SCHEMATIC
COOPER BEST MANAGEMENT PRACTICES PLAN
DAYHOIT (HARLAN), KENTUCKY

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
2456 Fortune Drive, Suite 100
Lexington, KY 40509
(859) 294-5155

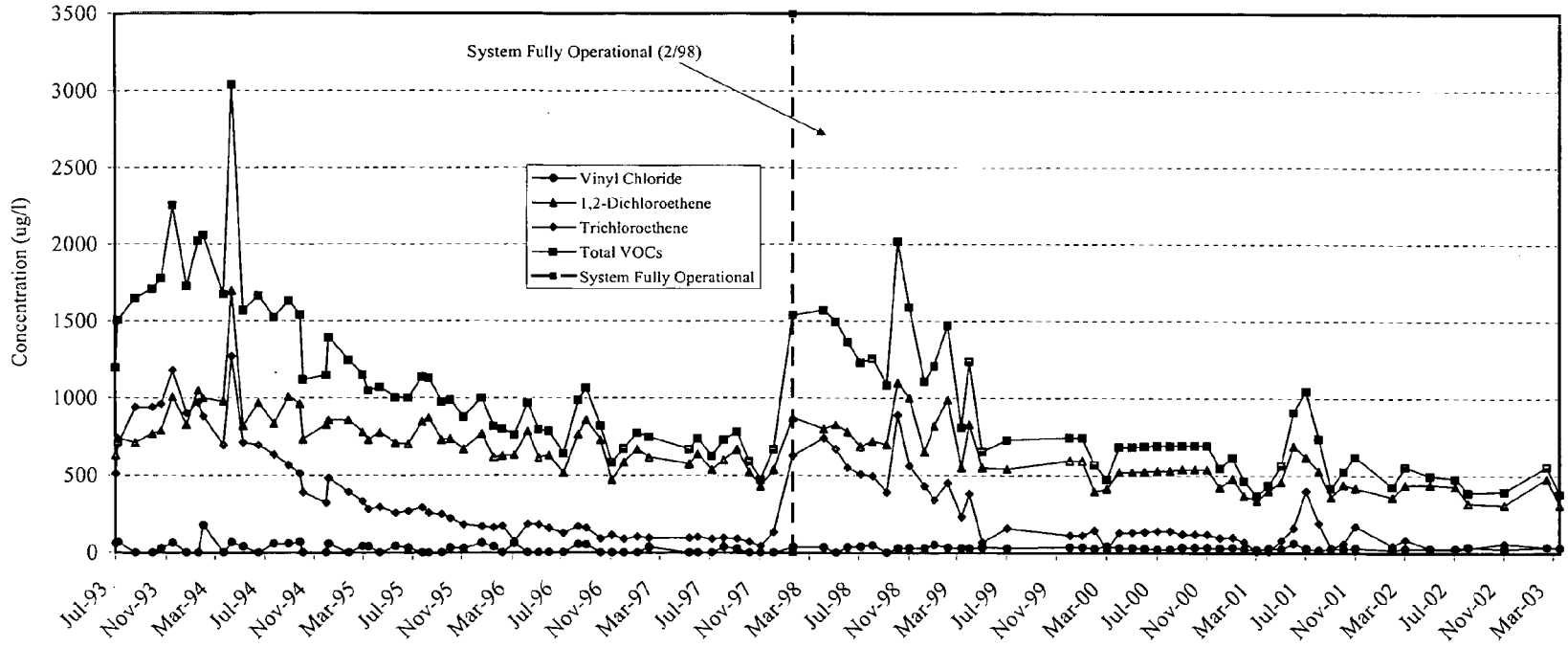
CHBMP-03.DWG

Figure 8

Influent VOC Concentrations Versus Time

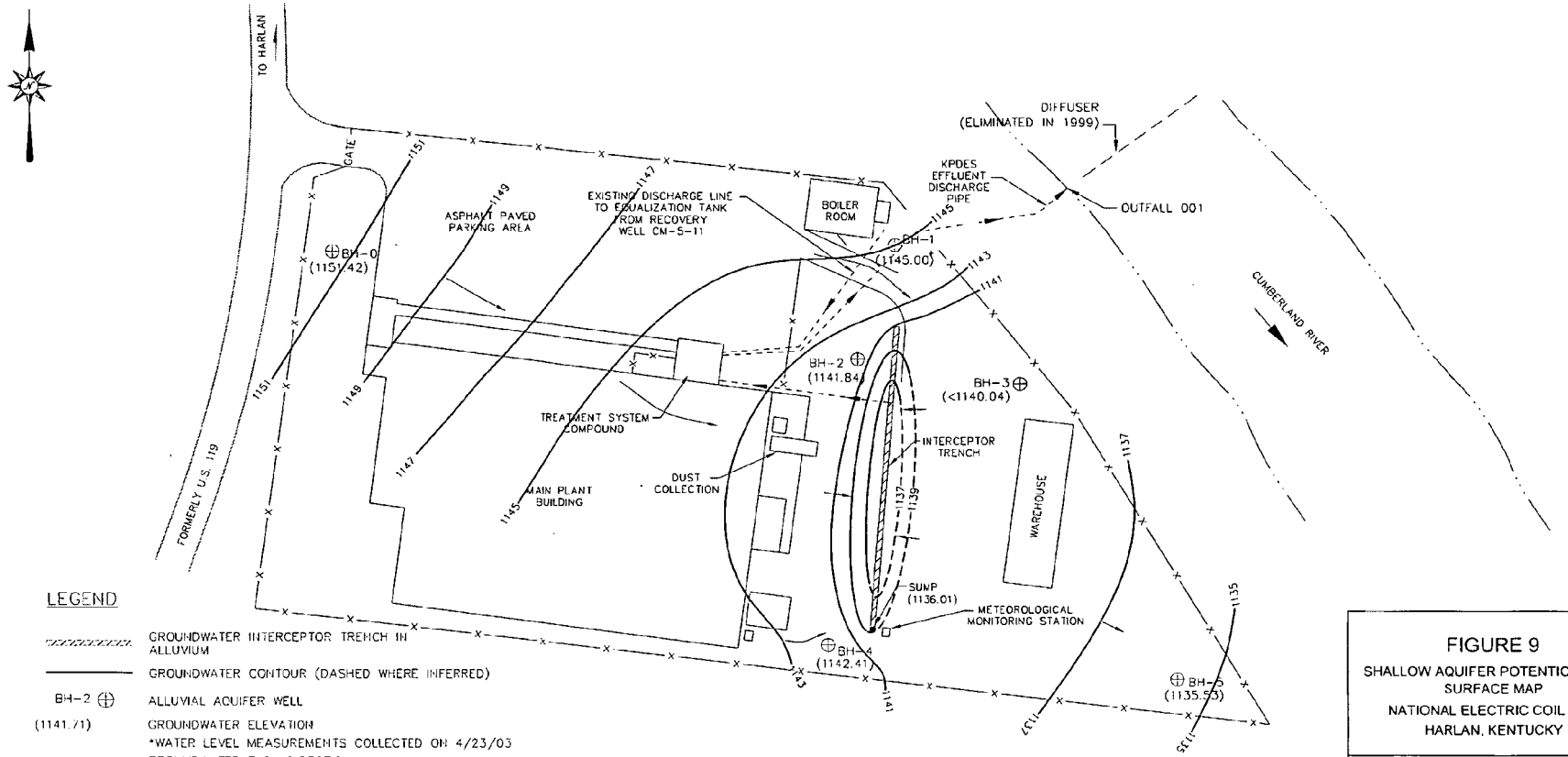
National Electric Coil Facility

Harlan, Kentuckey



File: P:\Shield Projects (Non-UST)\303-1360 Cooper NEC Harlan KY\2003 Semi-Annual Sampling Report\Figures\Figure 5 Influent Database

FIGURE 5



LEGEND

- GROUNDWATER INTERCEPTOR TRENCH IN ALLUVIUM
- GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- BH-2 ⊕ ALLUVIAL AQUIFER WELL
- (1141.71) GROUNDWATER ELEVATION
  *WATER LEVEL MEASUREMENTS COLLECTED ON 4/23/03
- GROUNDWATER FLOW DIRECTION

GROUNDWATER CONDITIONS

THE WATER LEVELS REPRESENTED IN THIS REPORT ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME.

POTENTIOMETRIC CONTOUR MAPS GENERATED FROM THIS DATA ARE CONSTRUCTED BY INTERPOLATION BETWEEN POINTS OF KNOWN STATIC WATER LEVEL ELEVATIONS AND USING KNOWLEDGE OF SPECIFIC SITE CONDITIONS. ACTUAL STATIC WATER LEVELS AT LOCATIONS BETWEEN THE MONITORING POINTS MAY DIFFER FROM THOSE DEPICTED.

DRAWING SOURCE– CIVIL & ENVIRONMENTAL CONSULTANTS INC. PITTSBURGH, PA. 12/8/02

FIGURE 9

SHALLOW AQUIFER POTENTIOMETRIC SURFACE MAP

NATIONAL ELECTRIC COIL SITE

HARLAN, KENTUCKY

MAY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

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Lexington, KY 40509
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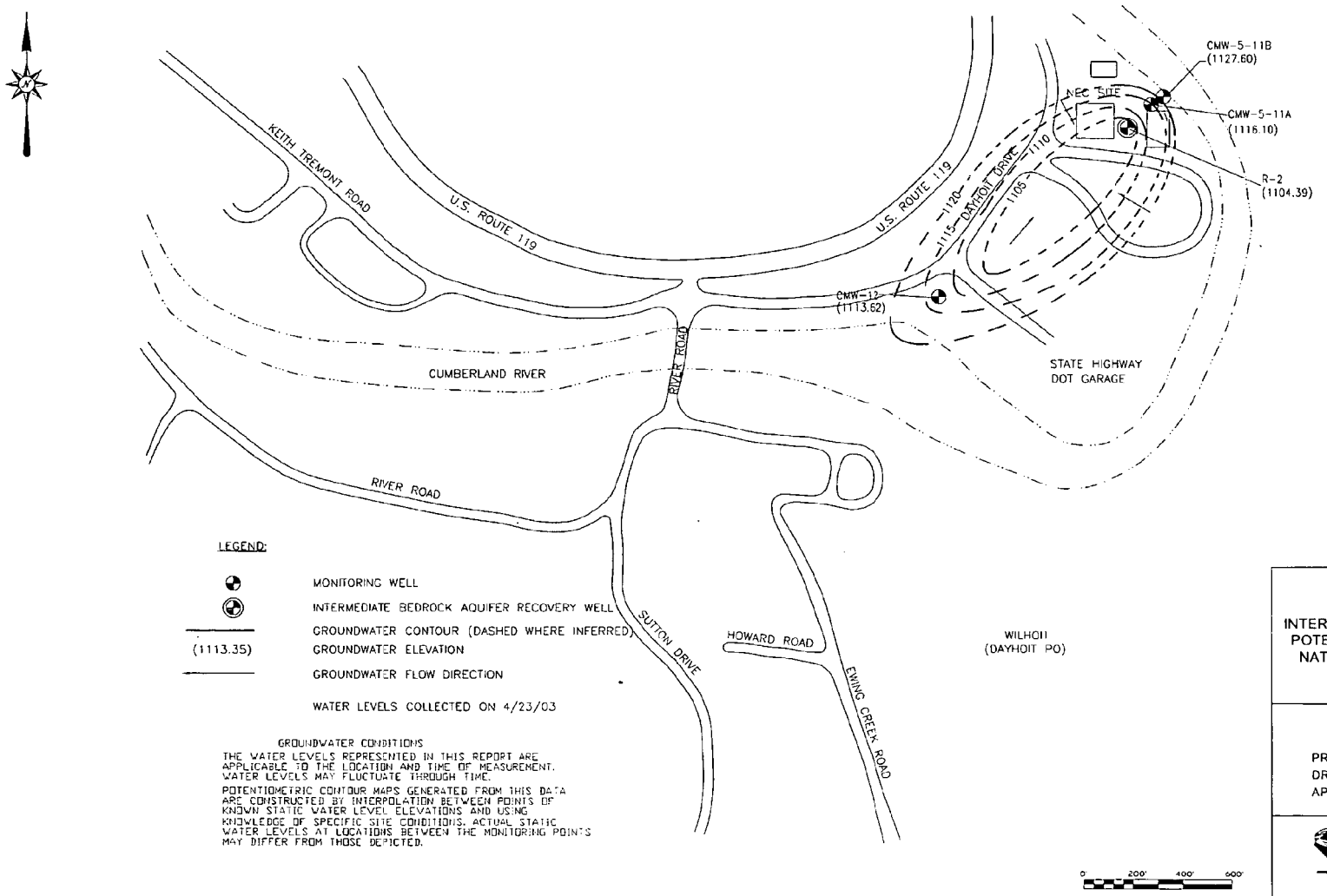

FIGURE 10

INTERMEDIATE BEDROCK AQUIFER POTENTIOMETRIC SURFACE MAP
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY

MAY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

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Lexington, KY 40509
(859) 294-5155

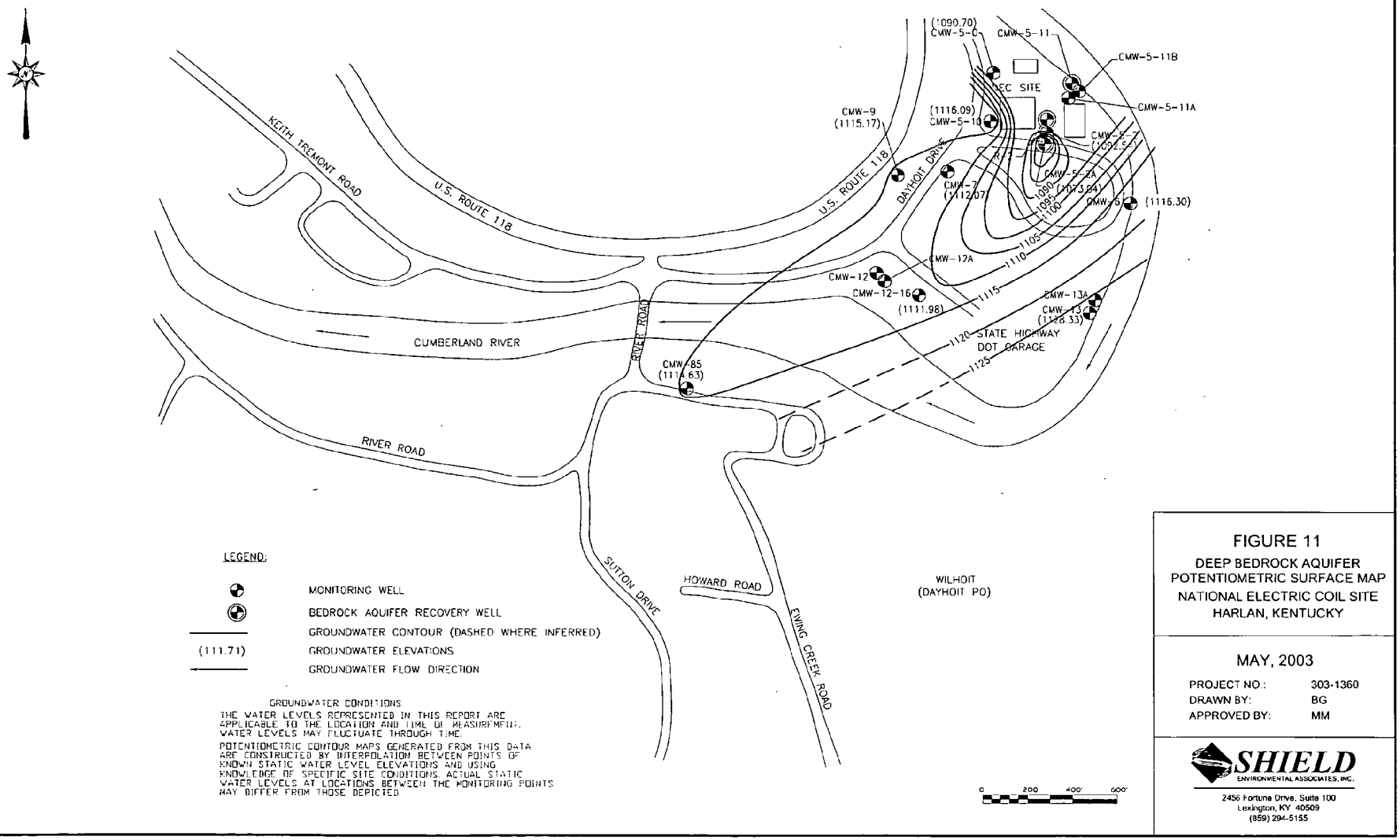

FIGURE 11

DEEP BEDROCK AQUIFER
POTENTIOMETRIC SURFACE MAP
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY

MAY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

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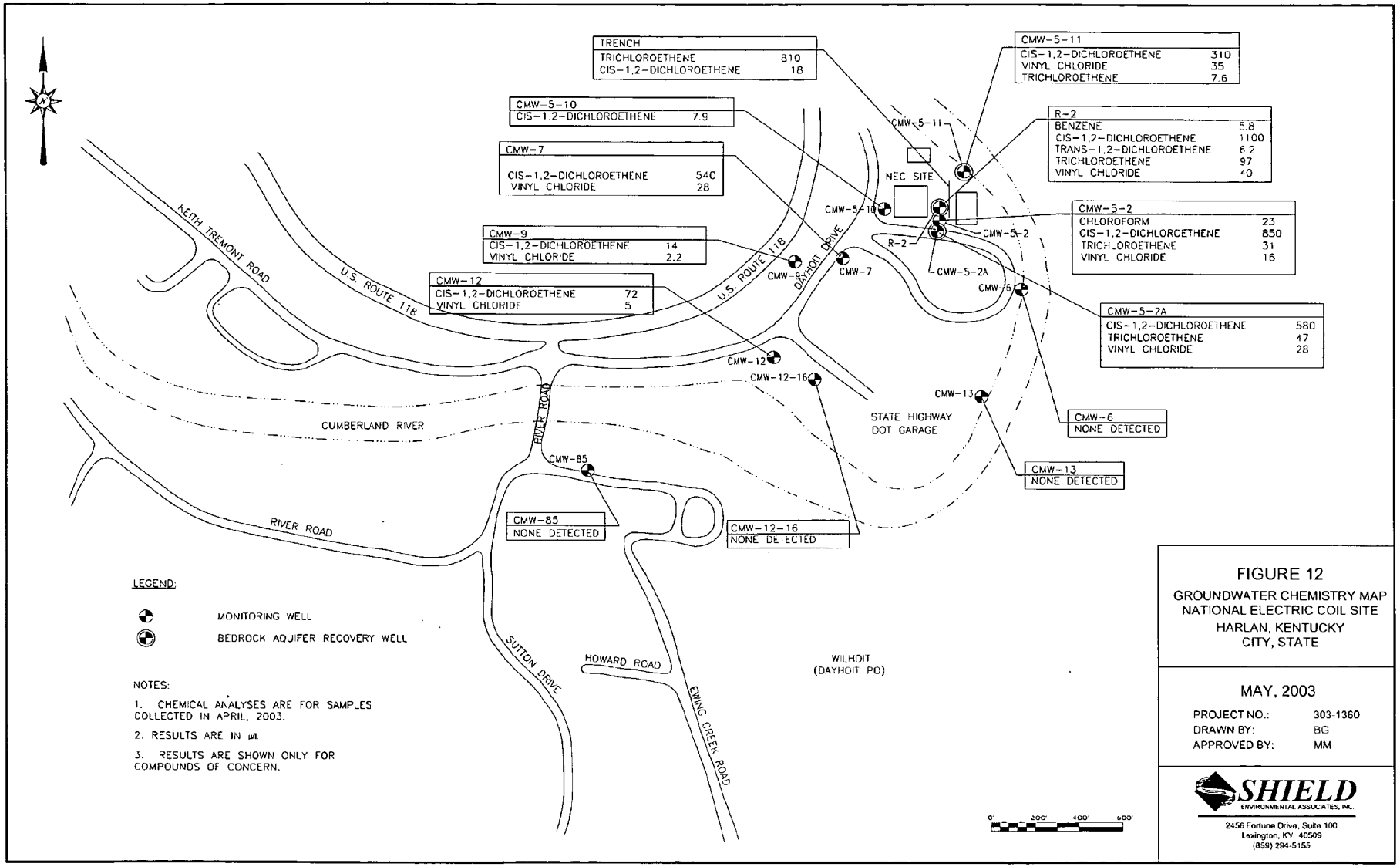

LEGEND:

- MONITORING WELL
- BEDROCK AQUIFER RECOVERY WELL

NOTES:

1. CHEMICAL ANALYSES ARE FOR SAMPLES COLLECTED IN APRIL, 2003.
2. RESULTS ARE IN µg/L
3. RESULTS ARE SHOWN ONLY FOR COMPOUNDS OF CONCERN.

FIGURE 12

GROUNDWATER CHEMISTRY MAP
NATIONAL ELECTRIC COIL SITE
HARLAN, KENTUCKY
CITY, STATE

MAY, 2003

PROJECT NO.:	303-1360
DRAWN BY:	BG
APPROVED BY:	MM

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
2456 Fortune Drive, Suite 100
Lexington, KY 40509
(859) 294-5155

APPENDIX A

RECOVERY DATA

Date	Flow Volume	Total VOCs Removed	Cumulative VOC Mass Removed	Cumulative Water Recovered
	(Mgal)	(lb/mo)	(lb)	(gal)
Jan-97	5.58	31.31	31	5,580,000
Feb-97	5.04	32.55	64	10,620,000
Mar-97	5.58	34.77	99	16,200,000
Apr-97	5.40	31.92	131	21,600,000
May-97	5.58	32.99	164	27,180,000
Jun-97	5.40	30.19	194	32,580,000
Jul-97	5.58	34.36	228	38,160,000
Aug-97	5.58	29.06	257	43,740,000
Sep-97	5.40	32.87	290	49,140,000
Oct-97	1.40	9.10	299	50,535,000
Nov-97	1.30	6.38	306	51,831,000
Dec-97	1.79	8.80	314	53,616,600
Feb-98	0.13	1.65	316	53,745,300
Mar-98	3.43	44.12	360	57,180,200
Apr-98	2.88	37.04	397	60,063,900
May-98	2.12	27.85	425	62,187,300
Jul-98	3.91	44.48	469	66,095,600
Aug-98	1.85	18.97	488	67,943,500
Sep-98	3.20	33.68	522	71,145,900
Oct-98	2.25	20.37	542	73,397,300
Nov-98	2.50	11.53	554	75,899,700
Dec-98	1.19	88.58	643	77,087,300
Jan-99	3.01	28.32	671	80,100,000
Feb-99	4.21	44.94	716	84,311,900
Mar-99	3.93	60.32	776	88,240,200
Apr-99	4.08	39.05	815	92,316,500
May-99	3.48	35.93	851	95,800,500
Jun-99	5.23	28.44	880	101,028,500
Jul-99	3.26	17.73	897	104,287,500
Aug-99	3.22	19.55	917	107,506,500
Sep-99	7.30	44.32	961	114,803,500
Oct-99	6.97	78.05	1,039	121,777,500
Nov-99	6.66	74.50	1,114	128,434,500
Dec-99	5.83	13.22	1,127	134,265,500
Jan-00	9.92	60.02	1,187	144,185,500
Feb-00	8.38	50.39	1,237	152,565,500
Mar-00	8.25	34.75	1,272	160,815,500
Apr-00	8.53	33.36	1,305	169,345,500
May-00	5.29	27.53	1,333	174,635,500
Jun-00	4.31	21.19	1,354	178,945,500

Date	Flow Volume	Total VOCs Removed	Cumulative VOC Mass Removed	Cumulative Water Recovered
	(Mgal)	(lb/mo)	(lb)	(gal)
Jul-00	6.75	35.12	1,389	185,694,500
Aug-00	7.38	41.30	1,431	193,074,500
Sep-00	7.56	40.09	1,471	200,634,500
Oct-00	7.25	39.56	1,510	207,888,500
Nov-00	6.91	37.62	1,548	214,801,500
Dec-00	7.60	41.20	1,589	222,396,500
Jan-01	7.30	32.15	1,621	229,696,500
Feb-01	8.00	38.83	1,660	237,696,500
Mar-01	8.40	31.46	1,691	246,096,500
Apr-01	7.30	21.85	1,713	253,396,500
May-01	4.80	16.71	1,730	258,196,500
Jun-01	7.60	31.44	1,762	265,796,500
Jul-01	3.57	25.65	1,787	269,361,500
Aug-01	7.47	60.81	1,848	276,832,500
Sep-01	4.69	27.09	1,875	281,521,779
Oct-01	6.65	22.34	1,897	288,176,525
Nov-01	6.20	24.97	1,922	294,381,071
Dec-01	6.10	29.74	1,952	300,479,022
Jan-02	8.51	41.85	1,994	308,991,022
Feb-02	7.26	35.94	2,030	316,252,022
Mar-02	7.72	25.71	2,056	323,968,022
Apr-02	7.54	32.03	2,088	331,506,022
May-02	7.78	33.50	2,121	339,284,022
Jun-02	6.59	24.55	2,146	345,878,022
Jul-02	6.17	23.51	2,169	352,047,022
Aug-02	5.70	20.65	2,190	357,751,022
Sep-02	6.09	17.27	2,207	363,841,022
Oct-02	6.51	19.17	2,226	370,351,022
Nov-02	6.56	19.37	2,246	376,913,022
Dec-02	6.22	19.69	2,265	383,133,022
Jan-03	1.88	5.26	2,271	385,013,022
Feb-03	5.42	15.80	2,286	390,433,022
Mar-03	5.99	25.65	2,312	396,423,022
Apr-03	7.14	20.93	2,333	403,563,022
May-03	5.33	15.31	2,348	408,893,022
Jun-03	7.14	21.05	2,369	416,033,022

APPENDIX B

HISTORICAL ANALYTICAL DATA

Trench

Analytes **VOLATILE ORGANICS (ug/l)**	Federal MCL	Mar-98	Mar-99	Apr-00	May-00	Oct-00	Apr-01	Sep-01	Apr-02	Sep-02	Apr-03
Vinyl Chloride	2					U	U	U	U	U	U
Acetone	--					U	U	U	3.J	U	U
Carbon Disulfide	--					U	U	U	U	U	U
1,1-Dichloroethene	7					U	U	U	U	U	U
1,1-Dichloroethane	--					U	U	U	U	U	U
1,2-Dichloroethene (total)	70	NA	78	6.6	62	76	13	78	55	69	18
Chloroform	--					U	U	U	U	U	U
Trichloroethene	5	2280	2700	270	1800	2300	410	910	1700	1300D	810
Benzene	5					U	U	U	U	U	U
Tetrachloroethene	5					U	U	U	3.J	U	U
1,1,2,2-Tetrachloroethane	--					U	U	U	U	U	U
Toluene	1000					U	U	U	U	U	U
Chlorobenzene	--					U	U	U	U	U	U
Ethylbenzene	700					U	U	U	U	U	U
Styrene	100					U	U	U	U	U	U
Xylene (total)	10000					U	U	U	U	U	U

Notes:
J - Estimated value: less than the CRQL
U - Constituent analyzed for and not detected
NA - Well was not completed at the time of the July sampling event
NS - Well not sampled
D - Reported value was determined after dilution
B - Constituent detected in associated blank and is a suspected laboratory contaminant
MCL - Maximum contaminant level

R-2

Analytes **VOLATILE ORGANICS (ug/l)**	Federal MCL	Mar-98	Mar-99	Apr-00	May-00	Oct-00	Apr-01	Sep-01	Apr-02	Sep-02	Apr-03
Vinyl Chloride	2	54	49	NS	NS	43	34	38	33	35	40
Acetone	--					U	U	U	4.1J	4.1J	U
Carbon Disulfide	--					U	U	U	U	U	U
1,1-Dichloroethene	7					U	U	2.8	3.9	3	U
1,1-Dichloroethane	--					U	U	U	U	U	U
1,2-Dichloroethene (total)	70	1455	2100	NS	NS	1400	1307	1407	1307	1206.4D	1106.2
Chloroform	--					U	U	U	U	U	U
Trichloroethene	5	1460	1500	NS	NS	600	210	170	200	130	97
Benzene	5					U	U	5.4	5.3	5	5.8
Tetrachloroethene	5					U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	--					U	U	U	U	U	U
Toluene	1000					U	U	U	U	U	U
Chlorobenzene	--					U	U	U	U	U	U
Ethylbenzene	700					U	U	U	U	U	U
Styrene	100					U	U	U	U	U	U
Xylene (total)	10000					U	U	U	U	U	U

Notes:
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NS - Well not sampled
D - Reported value was determined after dilution
B - Constituent detected in associated blank and is a suspected laboratory contaminant
MCL - Maximum contaminant level

Well Number 5-2																								
Analytes VOLATILE ORGANICS (ug/l)	Federal MCL	Jul-93	Aug-93	Jan-94	Jul-94	Nov-94	Apr-95	Oct-95	May-96	Nov-96	Apr-97	Nov-97	Apr-98	Oct-98	Apr-99	Oct-99	Apr-00	May-00	Oct-00	Apr-01	Sep-01	Apr-02	Sep-02	Apr-03
Vinyl Chloride	2	180	110	310	110	100	51	110	77	440	380	260	110	190	110	33	41	31	37	32	15	16	22	16
Acetone	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	3.4J	U	U
Carbon Disulfide	--	U	7	U	U	U	U	U	U	U	U	12	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	7	3 J	3 J	U	3 J	0.7 J	U	3 J	U	4 J	U	2.6 J	2.7 J	3.6 J	3.0J	U	U	U	2	2	U	1.9J	2.6J	U
1,1-Dichloroethane	--	1J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	70	1500 D	1700 D	3200 D	2300 D	1800 D	1700 D	1600 D	1500 D	1200	1700	1200	870 D	1100 D	1300	1200	1200	540	610	870	899	905	1105.6D	850
Chloroform	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	25	8.2	23
Trichloroethene	5	1700 D	620 D	2500 D	2000 D	1100 D	1500 D	990 E	1200 D	510	570	400	130	470 D	170	160	180	110	110	51	76	57	40	31
Benzene	5	0.7 J	U	0.3 J	2 J	U	U	1 J	U	2 J	2.5 J	1.2 J	1.1 J	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5	2 J	U	6	3 J	2 J	2 J	U	U	0.6 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	--	U	U	U	U	U	U	2 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	1000	1 J	1 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	700	U	U	U	U	U	U	U	U	0.2 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Xylene (total)	10000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Notes:
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MCL - Maximum contaminant level

Well Number 5-2A												
Analytes VOLATILE ORGANICS (ug/l)	Federal MCL	Oct-98	Apr-99	Oct-99	Apr-00	May-00	Oct-00	Apr-01	Sep-01	Apr-02	Sep-02	Apr-03
Vinyl Chloride	2	190	110	33	41	31	22	23	31	25	25	28
Acetone	--	U	U	U	U	U	U	U	U	3.6J	3.6J	U
Carbon Disulfide	--	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	7	3.6 J	3.0J	U	U	U	2	2	2.1	1.9J	1.6J	U
1,1-Dichloroethane	--	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	70	1100 D	1300	1200	1200	540	870	770	950	640	703.4D	590
Chloroform	--	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	5	470 D	170	160	180	110	67	110	150	39	85	47
Benzene	5	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	--	U	U	U	U	U	U	U	U	U	U	U
Toluene	1000	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	--	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	700	U	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U	U
Xylene (total)	10000	U	U	U	U	U	U	U	U	U	U	U

Notes:

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U - Constituent analyzed for and not detected

NA - Well was not completed at the time of the July sampling event

NS - Well not sampled

D - Reported value was determined after dilution

B - Constituent detected in associated blank and is a suspected laboratory contaminant

MCL - Maximum contaminant level

Well Number 5-11																								
Analytes VOLATILE ORGANICS (ug/l)	Federal MCL	Jul-93	Aug-93	Jan-94	Jul-94	Nov-94	Apr-95	Oct-95	May-96	Nov-96	Apr-97	Nov-97	Apr-98	Oct-98	Apr-99	Oct-99	Apr-00	May-00	Oct-00	Apr-01	Sep-01	Apr-02	Sep-02	Apr-03
Vinyl Chloride	2	U	45	42	52	38	45	37	34	65	120	40	8.4	24	8	26	20	22	22	24	28	20	22	35
Acetone	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	4	4	U	3.5J	3J	U
Carbon Disulfide	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	7	U	U	U	2 J	U	U	U	U	2 J	1.8 J	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	70	2 J	660 D	1100 D	1200 D	910 D	730 D	630 D	720 D	670	660	610	200 D	230 D	140	310	380	250	200	360	360	210	260D	310
Chloroform	--	U	U	U	U	U	U	U	U	U	U	U	U	14	U	U	U	U	U	U	U	U	U	U
Trichloroethene	5	3 J	710 D	870 D	940 D	460 D	270 D	230 D	170	120	95	100	43	35	11	U	21	U	3	8.9	9.1	1.3J	U	7.6
Benzene	5	U	U	U	U	U	U	U	U	0.9 J	1 J	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5	U	2 J	1 J	1 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	1000	3 J	U	U	U	U	2 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	--	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	700	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	100	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Xylene (total)	10000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	6.5	U	U	U	U	U	U	U	U

System

Notes:
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